Ozone and Air Pollution

August 1998

ANSWERS TO COMMONLY ASKED QUESTIONS ABOUT OZONE

The following are some commonly asked questions and answers concerning ozone and air pollution and the recently revised National Ambient Air Quality Standard (NAAQS). The NAAQS final revision occurred on July 17, 1997, and on May 27, 1998, the first phase of implementation was initiated.

Q. What is ozone and where do you find it?

A. Ozone is a gas with a pungent odor and is a main component of smog. Ozone occurs in the environment due to the interaction of ultraviolet light (sunlight) with a group of air pollutants called oxides of nitrogen. Upper atmospheric ozone acts to shield the earth from the harmful effects of sunlight, and should not be confused with the more dangerous ground-level ozone which is considered a form of air pollution. Background levels of ozone at ground level are usually <0.05 parts per million (ppm). Some sources which contribute to the ozone level both at ground level and in the upper atmosphere, when they interact with sunlight, are volatile organic compounds (VOCs) such as hydrocarbons which are found in car exhaust, petroleum refining, gasoline, and dry cleaning materials. Electrical sources such as x-ray or ultraviolet generators, arc welding equipment, and mercury vapor lights also produce ozone. Ozone is used as an oxidizing agent in the chemical industry, as a disinfectant for air and water, for bleaching textiles, oils, waxes, and paper pulp, for aging liquor and wood, and in treating industrial waste.

Q. Is ozone found more at one time of the year than another?

A. Yes. Ozone levels in some urban areas typically rise from May through September. This is when higher temperatures and the increased amount of sunlight combine with the stagnant atmospheric conditions that are associated with ozone air pollution episodes (smog).

Q. What are the health effects associated with ozone exposure?

A. Ozone is a respiratory irritant. Symptoms include shortness of breath, chest pain when inhaling deeply, wheezing, and coughing. Healthy young individuals can experience problems such as decreased lung function when exerting themselves (such as during heavy exercise) when ozone levels are elevated. There is evidence that the lung function changes experienced at somewhat higher ozone levels may persist for several days after the exposure.

Exposure to ozone concentrations in the air around us (ambient) has been linked to increased hospital admissions for respiratory aliments, such as asthma. Repeated exposure to ozone can make people more susceptible to respiratory infection and lung

inflammation, and can aggravate preexisting respiratory diseases. Recently, attention has begun to focus on the effects of long-term, repeated exposures to high levels of ozone.

Q. Are some people at greater risk than others?

A. Children are most at risk from exposure to ozone because they are active outside, playing and exercising during the summertime when ozone levels are at their highest. Adults who are outdoors and moderately active during the summer months, such as construction workers and other outdoor workers, are also among those most at risk. These individuals, as well as those with respiratory illnesses, such as asthma, can experience a reduction in lung function and increased respiratory symptoms, such as chest pain and cough, when exposed to relatively low ozone levels during periods of moderate exertion.

The U.S. Environmental Protection Agency (EPA) has identified three groups of people who may be at particular risk from high ozone levels:

1) People with pre-existing respiratory disease (i.e., chronic bronchitis, emphysema, asthma) cannot tolerate an additional reduction in lung function due to ozone exposure.

2) A portion (5% to 20%) of the total U.S. population are referred to as "responders." These people respond to ozone exposure while exercising with significantly greater losses in lung function than the average person. Currently, there is no way to identify these "responders" prior to ozone exposure.

3) Individuals who exercise outdoors or participate in outdoor activities which increase their respiratory rate respond much more severely to ozone exposure than people at rest.

Q. Are there any standards or guidelines to protect people from exposures to ozone?

A. Yes. The Occupational Safety and Health Administration's (OSHA) standard for ozone in the workplace is 0.1 ppm, as an 8-hour, time-weighted average. The American Conference of Governmental Industrial Hygienists (ACGIH) has suggested a threshold limit value (TLV) of 0.1 ppm as a ceiling.

In July 1997, the EPA adopted a new National Ambient Air Quality Standard (NAAQS) for ozone. Prior to July 1997, the NAAQS for ozone was 0.12 ppm, not to be exceeded during a one-hour period. This type of standard measurement caused some localities to "flip flop" in and out of compliance. The new standard is 0.08 ppm and is an 8-hour, time-weighted average. The new standard is more protective of public health since the exposure level has been reduced over a longer period of time.

In setting the 8-hour standard at 0.08 ppm, the EPA recognizes that since there is no discernible threshold below which no adverse health effects occur, no level would eliminate all risk. Thus, a zero-risk standard is not possible, nor is it required by the

Clean Air Act. The selected 0.08 ppm level is based on the judgment that, at this level, public health will be protected with an adequate margin of safety.

With the adoption of the new 0.08 ppm standard, areas which previously were in compliance may now be found to exceed the standard. Ground-level ozone levels in ambient air have not changed significantly since the new standard went into effect, but the new standard will require these areas to reduce their ground-level ozone levels further.

Q. What can be done to lower the ground-level ozone in the environment?

A. One thing that can be done by families and individuals is the wise use of automobiles, motorcycles, boats, lawn mowers, and other machinery powered by internal combustion engines. Plan and limit trips, make sure vehicles or machinery are in good working order and burning fuels efficiently, and try to avoid use when the ozone levels are expected to be elevated or an ozone alert is in effect.

Q. Where can I look for more information on this topic?

A. If you need further information or clarification, contact the Virginia Department of Health, Toxic Substances Information, at (804) 786-1763 or look for this information on the VDH website at www.vdh.state.va.us.

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